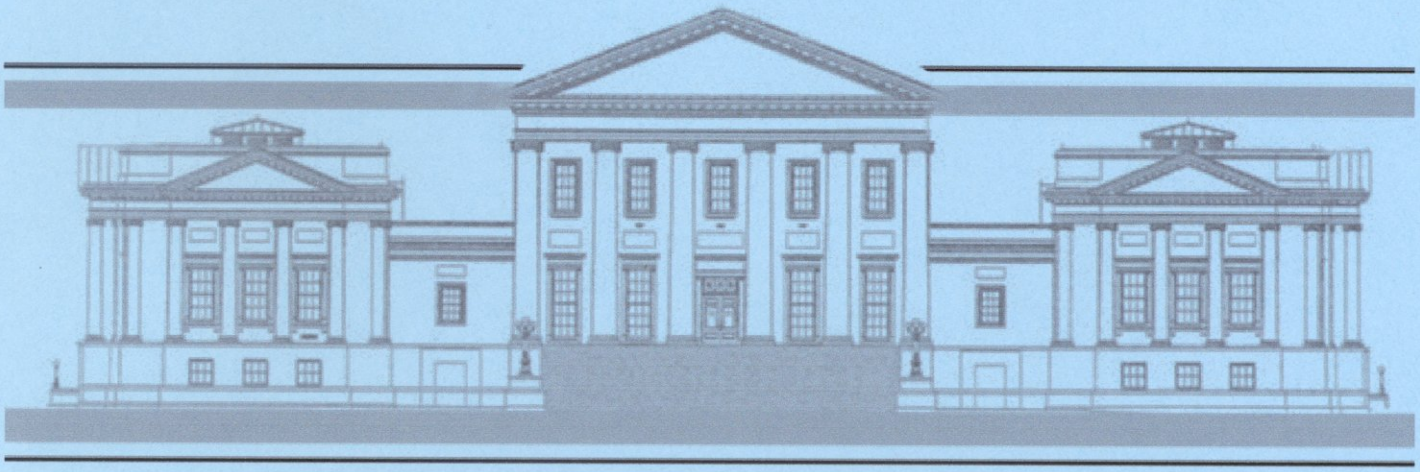


VIRGINIA CONSTRUCTION CODE

PART I OF THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE

2006

Effective May 1, 2008

36. Replace Section R602.10, including all subsections, with the following:

R602.10 Wall bracing. The use of this section is subject to the following clarification of cross-references:

1. In Sections R301.2.2.1.1 and R301.2.2.4.1, delete the references to Table R602.10.1.

2. In Section R301.3, delete the exception to Item 1.

3. References to Table R602.10.1 in all other provisions of the IRC except those in Items 1 and 2 above shall be references to Table R602.10.1.5 of this section.

4. In Section R403.1.6, delete the sentence which reads, "In Seismic Design Categories D0, D1 and D2, anchor bolts shall be spaced at 6 feet (1829 mm) on center and located within 12 inches (304 mm) of the ends of each plate section at interior braced wall lines when required by Section R602.10.9 to be supported on a continuous foundation." In addition, all references to Figure R602.10.5 in Section R403.1.6 shall be references to Figure R602.10.3.3(1) of this section.

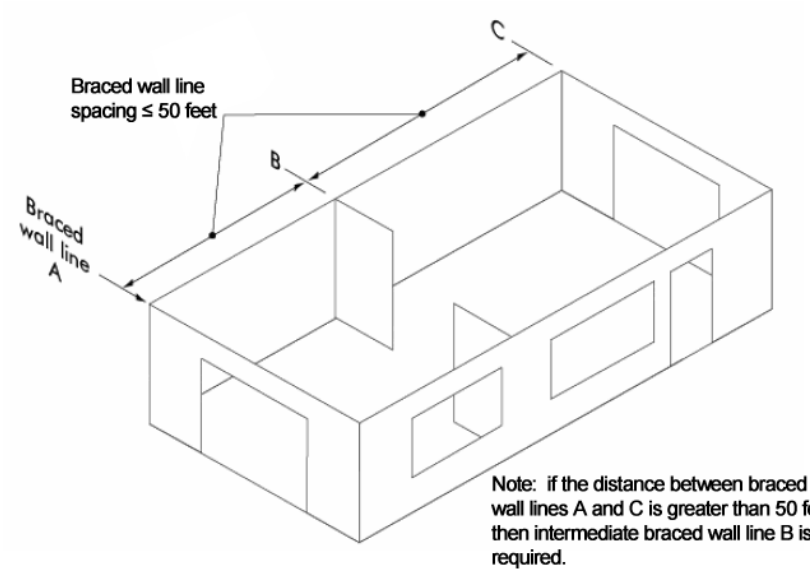
5. Change the reference in Section R502.2.1 from Section R602.10.8 to Section R602.10.5 of this section.

All new buildings, additions and conversions shall be braced in accordance with this section. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with the International Building Code. For structures in areas where the wind speed from Table R301.2(1) is 110 mph or greater, an engineered design is required.

The building official may require the permit applicant to identify and locate on the construction documents the bracing methods utilized.

R602.10.1 Braced wall lines. Braced wall lines shall be straight lines through the building plan at each level provided with braced wall panels to resist lateral load. The percentage, location and construction of braced wall panels shall be as specified in this section.

R602.10.1.1 Spacing of braced wall lines. In each story, spacing of parallel braced wall lines shall not exceed 50 feet (15 240 mm) as shown in Figure R602.10.1.1. When braced wall lines exceed a spacing of 50 feet (15 240 mm), intermediate braced wall line(s) shall be provided. Each end of a braced wall line shall intersect perpendicularly with other braced wall lines or their projections.



For SI: 1 foot = 305 mm

FIGURE R602.10.1.1
BRACED WALL LINE SPACING

R602.10.1.2 Braced wall panels. Braced wall panels shall be full-height sections of wall constructed along a braced wall line to resist lateral loads in accordance with the intermittent bracing methods specified in Section R602.10.2 or the continuous sheathing methods specified in Section R602.10.3. Mixing of bracing methods shall be permitted as follows:

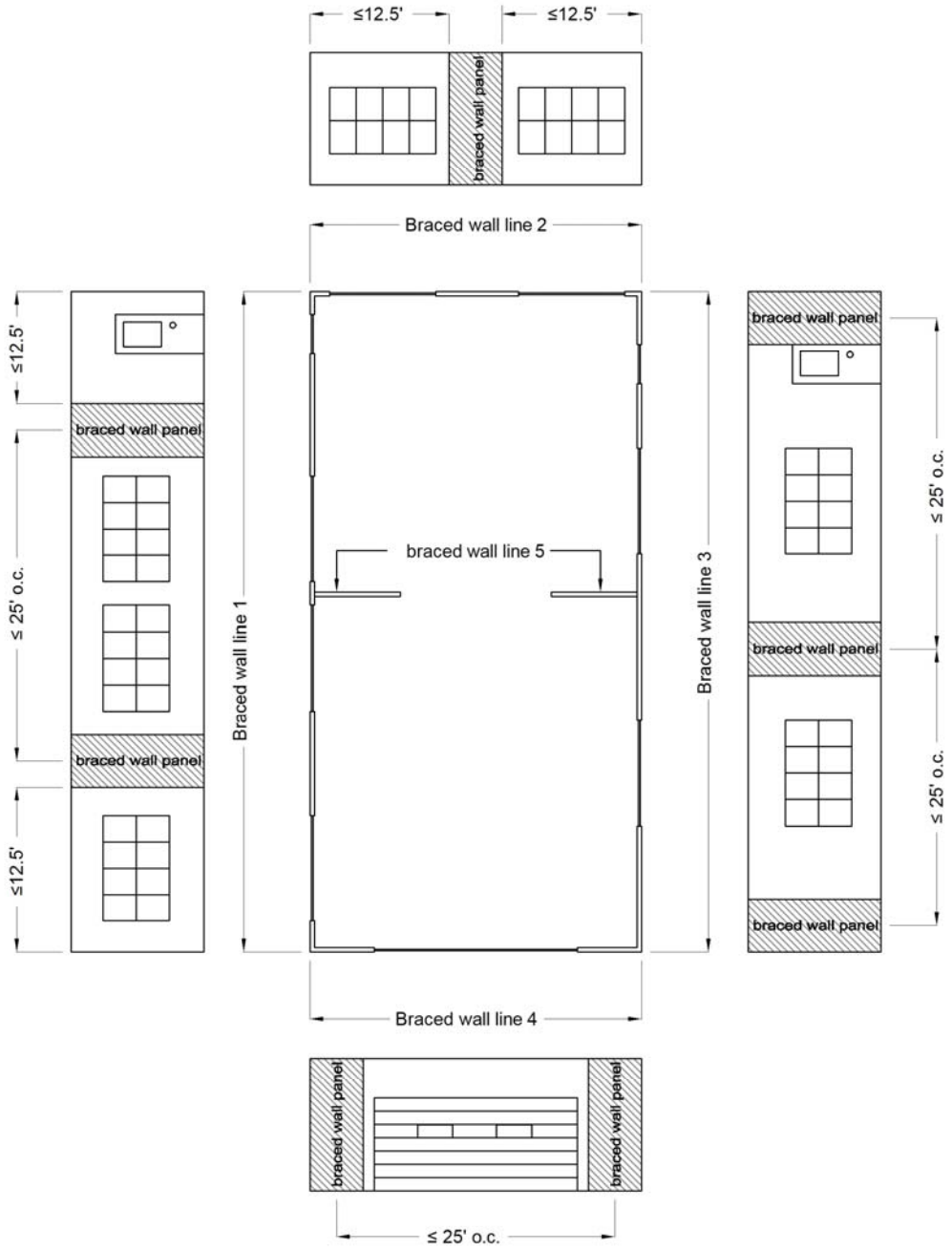
1. Mixing bracing methods from story to story shall be permitted.

2. Mixing bracing methods from braced wall line to braced wall line within a story shall be permitted, except that continuous sheathing methods shall conform to the additional requirements of Section R602.10.3.

3. Mixing intermittent bracing methods along a braced wall line shall be permitted for single-family dwellings in Seismic Design Categories A, B and C and townhouses in Seismic Design Categories A and B. The required percentage of bracing for the braced wall line with mixed methods shall use the higher bracing percentage, per Table R602.10.1.5, of all methods used.

R602.10.1.3 Braced wall panel location. Braced wall panels shall be located at least every 25 feet (7620 mm) on center and shall begin no more than 12.5 feet (3810 mm) from each end of a braced wall line or its projection as shown in Figure R602.10.1.3(1) and Figure R602.10.4, but not less than the percentages given in Table R602.10.1.5. Braced wall lines with continuous sheathing shall conform to the additional requirements of Section R602.10.3.3.

All braced wall panels shall be permitted to be offset out-of-plane from the designated braced wall line up to 4 feet (1219 mm) provided the total out-to-out offset in any braced wall line is not more than 8 feet (2438 mm) as shown in Figure R602.10.1.3(2).



For SI: 1 foot = 305 mm

FIGURE R602.10.1.3(1)
BRACED WALL PANELS AND BRACED WALL LINES

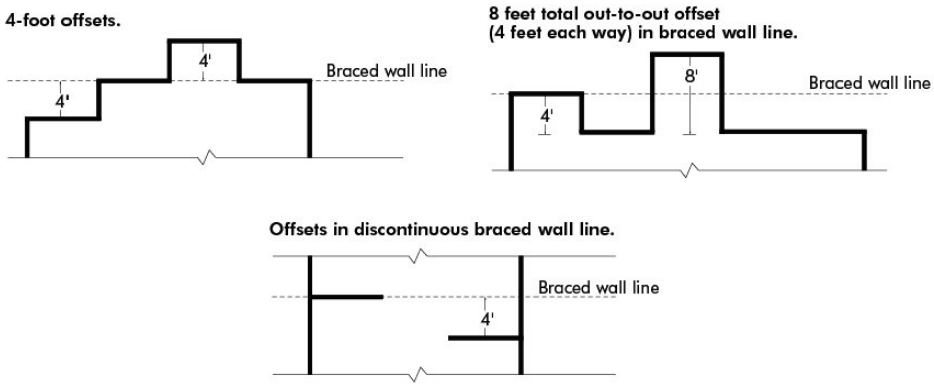
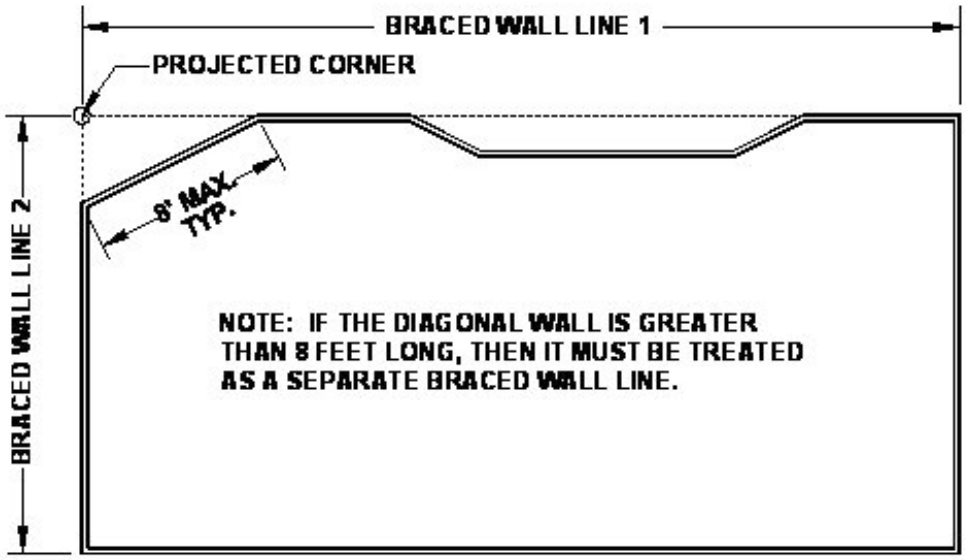


FIGURE R602.10.1.3(2)
OFFSETS PERMITTED FOR BRACED WALL PANELS ALONG A BRACED WALL LINE

R602.10.1.4 Angled walls. The walls of a braced wall line shall be permitted to angle out of plane for a maximum diagonal length of 8 feet (2438 mm). Where the angled wall occurs at a corner, the length of the braced wall line shall be measured from the projected corner as shown in Figure R602.10.1.4. Where the diagonal length is greater than 8 feet (2438 mm), it shall be considered its own braced wall line.

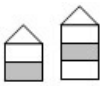
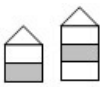


For SI: 1 foot = mm

FIGURE R602.10.1.4
ANGLED CORNERS

R602.10.1.5 Minimum required percentage of bracing. The minimum required percentage of bracing along each braced wall line shall be in accordance with Table R602.10.1.5 and shall be the greater of that required by the Seismic Design Category or the design wind speed.

TABLE R602.10.1.5[a,b,c]
MINIMUM REQUIRED PERCENTAGE OF WALL BRACING

SEISMIC DESIGN CATEGORY (SDC) OR WIND SPEED	FLOOR		MINIMUM REQUIRED PERCENTAGE OF FULL-HEIGHT BRACING PER WALL LINE			
			Braced wall line spacing less than or equal to 35'		Braced wall line spacing greater than 35' and less than or equal to 50'	
			Methods WSP, CS-WSP, CS-G, CS-PF	All other methods[d]	Methods WSP, CS-WSP, CS-G, CS-PF	All other methods[d]
SDC A, B or wind speed ≤100 mph		One-story house or top floor of a two- or three-story house.	16%	16%	23%	23%
		First floor of a two-story or second floor of a three-story house.	16%	25%	23%	36%
		First floor of a three-story house.	25%	35%	36%	50%
SDC C or wind speed <110 mph		One-story house or top floor of a two- or three-story house.	16%	25%	23%	36%
		First floor of a two-story house or second floor of a three-story house.	30%	45%	43%	64%
		First floor of a three-story house.	45%	60%	64%	86%

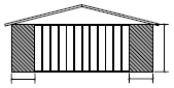
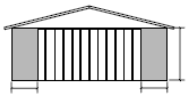
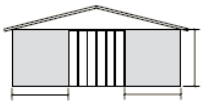
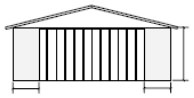
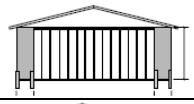
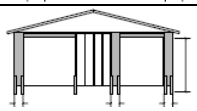
For SI: 1 foot = 305 mm

a. Foundation cripple wall panels shall be braced in accordance with Section R602.10.8.
b. Methods of bracing shall be as described in Sections R602.10.2 and R602.10.3.
c. The total amount of bracing required for a given braced wall line shall be the product of the minimum required percentage and all the applicable adjustment factors described in Sections R602.10.4, R602.10.7 and R602.10.8.
d. For Method GB, the percentage required shall be doubled for one-sided applications.

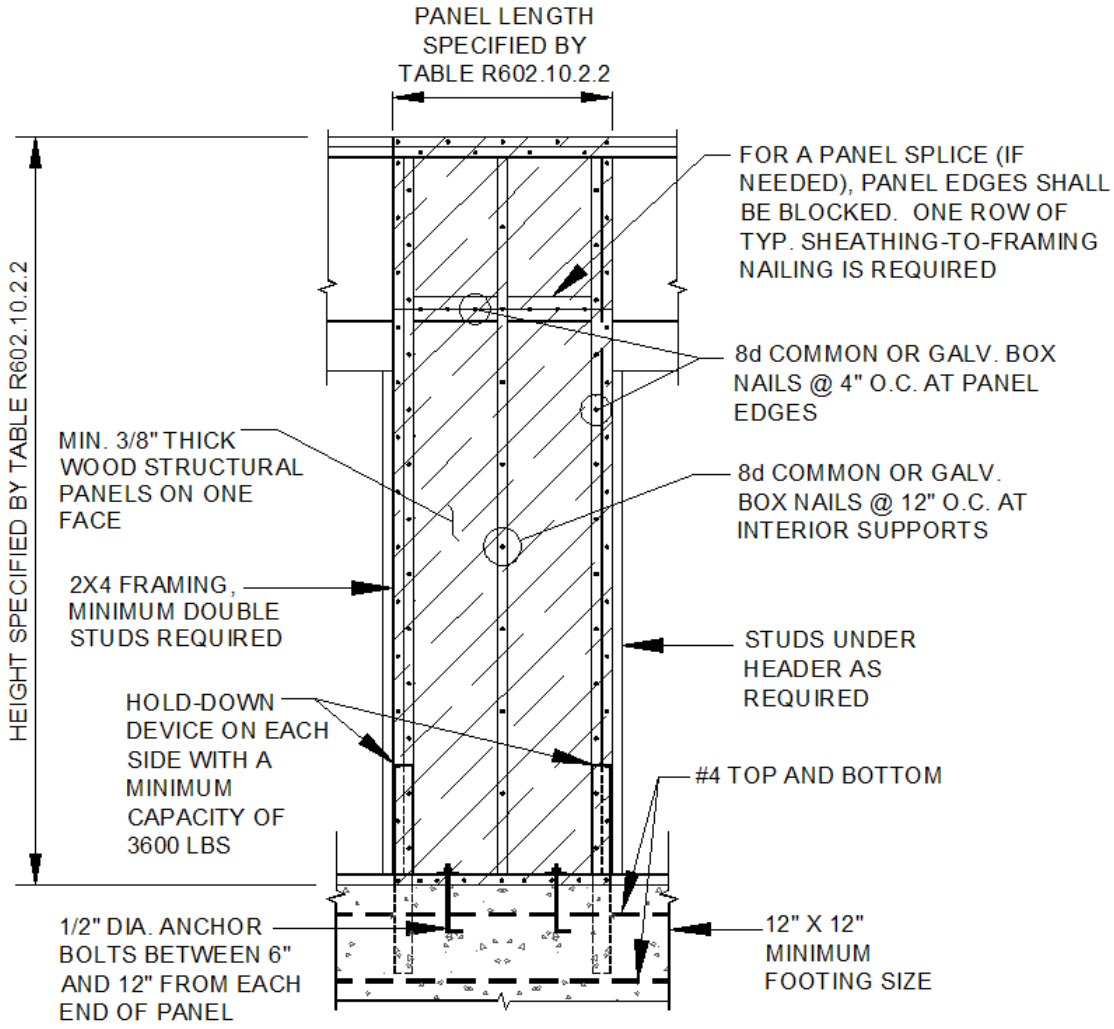
R602.10.2 Intermittent bracing methods. Intermittent braced wall panels shall comply with this section. The location of each panel shall be identified on the construction documents.

R602.10.2.1 Intermittent braced wall panels. Intermittent braced wall panels shall be constructed in accordance with one of the methods listed in Table R602.10.2.1.

TABLE R602.10.2.1
INTERMITTENT BRACING METHODS

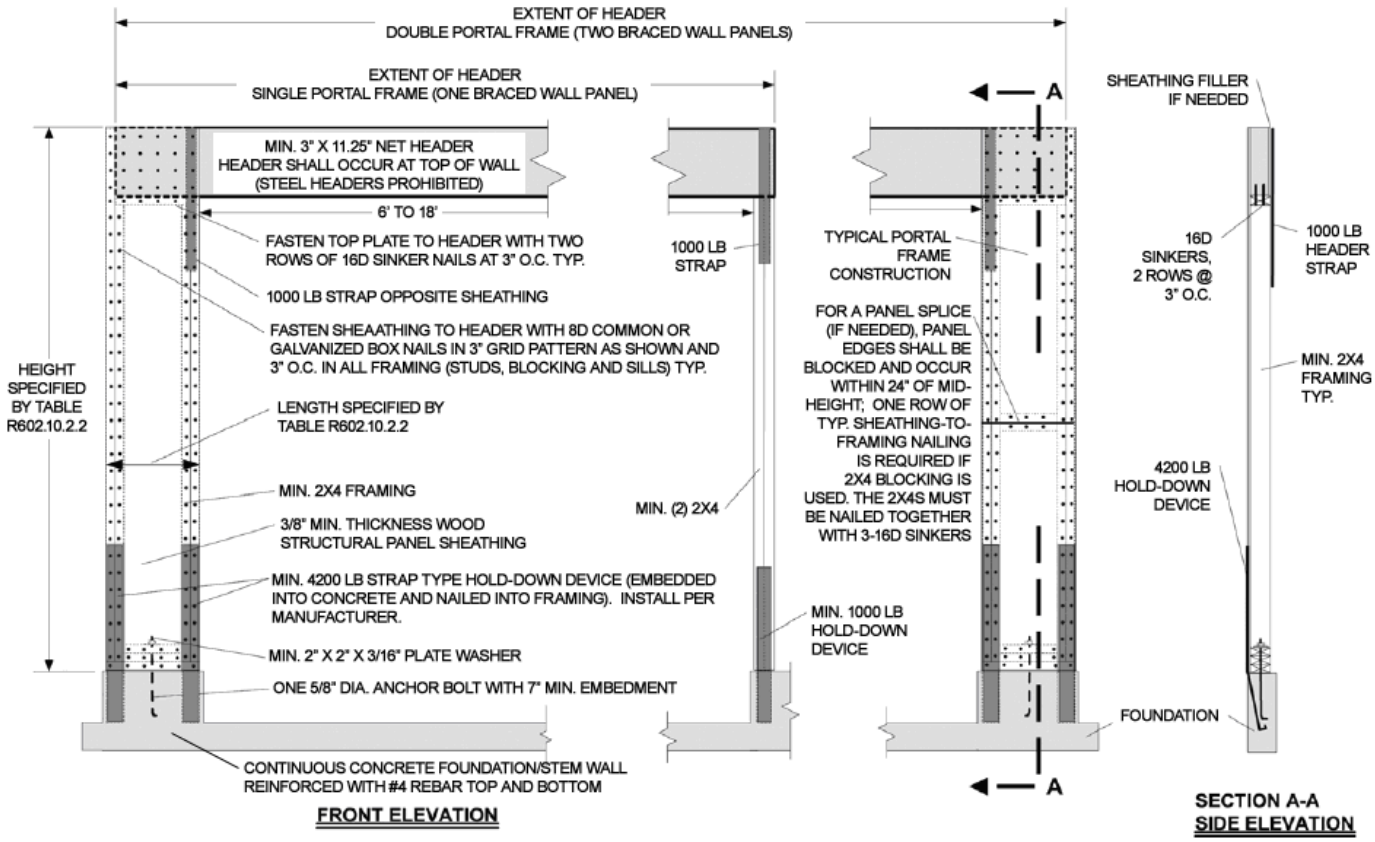
METHOD	MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA
LIB	Let-in-bracing	1x4 wood or approved metal straps at 45^0 to 60^0 angles		Wood: 2-8d nails per stud Metal: per manufacturer
DWB	Diagonal wood board at 24" spacing	5/8"		2-8d (2½" x 0.113") nails or 2 staples, $1^3/_4$" per stud
WSP	Wood structural panel	3/8"		6d common (2" x 0.113") nails at 6" spacing (panel edges) and at 12" spacing (intermediate supports) or 16 ga. x $1^3/_4$ staples: at 3" spacing (panel edges) at 6" spacing (intermediate supports)
SFB	Structural fiberboard sheathing	½" or $^{25}/_{32}$" for 16" stud spacing only		1½ galvanized roofing nails or 8d common 2½" x 0.131) nails at 3" spacing (panel edges) at 6" spacing (intermediate supports)
GB	Gypsum board	½"		Nails at 7" spacing at panel edges including top and bottom plates; for exterior sheathing nail size, see Table R602.3(1); for interior gypsum board nail size, see Table R702.3.5
PBS	Particleboard sheathing	3/8" or ½" for 16" stud spacing only		1½" galvanized roofing nails or 8d common (2½ x 0.131) nails at 3" spacing (panel edges) at 6" spacing (intermediate supports)
PCP	Portland cement plaster	See Section R703.6		1½", 11 gage, $^7/_{16}$" head nails at 16" spacing or $^7/_{16}$", 16 gage staples at 6" spacing
HPS	Hardboard panel siding	7/16"		0.092" dia., 0.225" head nails with length to accommodate 1½" penetration into studs at 4" spacing (panel edges), at 8" spacing (intermediate supports)
ABW	Alternate braced wall	See Figure R602.10.1(1)		See Figure R602.10.2.1(1)
IPF	Intermittent portal frame	See Figure R602.10.2.1(2)		See Figure R602.10.1(2)

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm



For SI: 1 foot = 305 mm, 1 inch = 25.4 mm, 1 pound = 4.45 N

FIGURE R602.10.2.1(1)
METHOD ABW: ALTERNATE BRACED WALL PANEL



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound = 4.45 N

FIGURE R602.10.2.1(2)
METHOD IPF: INTERMITTENT PORTAL FRAME BRACED WALL PANEL

R602.10.2.2 Minimum length of intermittent braced wall panels. The minimum length of each intermittent braced wall panel shall comply with Table R602.10.2.2. For Methods DWB, WSP, SFB, GB, PBS, PCP and HPS, each panel shall cover at least three studs where studs are spaced 16 inches (406 mm) on center or at least two studs where studs are spaced 24 inches (610 mm) on center. Only those full-height braced wall panels complying with the length requirements of Table R602.10.2.2(1) shall be permitted to contribute towards the minimum required percentage of bracing.

Exception: For Methods DWB, WSP, SFB, PBS, PCP and HPS, panel lengths less than the dimensions shown in Table R602.10.2.2 shall be permitted provided the effective lengths in accordance with Table R602.10.2(2) are used in place of actual lengths when determining compliance with the percentage of bracing required by Table R602.10.1.5.

TABLE R602.10.2.2(1)
MINIMUM LENGTH OF INTERMITTENT BRACED WALL PANELS[a,b]

BRACING METHOD	FLOOR		HEIGHT OF INTERMITTENT BRACED WALL PANEL				
			8'	9'	10'	11'	12'
DWB, WSP, SFB, GB[c], PBS, PCP, HPS	All		48"	48"	48"	53"	58"
ABW	All		28"	32"	34"	38"	42"
IPF		One-story house	16"	16"	16"	18"	20"
		First floor of a two-story house	24"	24"	24"	27"	29"

For SI: 1 foot = 305 mm, 1 inch = 25.4 mm

a. Interpolation shall be permitted.

b. When determining compliance with the percentage of bracing required by Table R602.10.1.5, the effective length of Method LIB shall be equivalent to 48" (1219 mm) provided it complies with the Table R602.10.2.1.

c. Gypsum board applied to both sides of the braced wall panel; where the gypsum board is applied to one side, the required length shall be doubled.

TABLE R602.10.2(2)
EFFECTIVE LENGTHS FOR BRACE WALL PANELS
WHEN DETERMINING PERCENTAGE OF BRACING[a]

ACTUAL LENGTH OF BRACED WALL PANEL	WALL HEIGHT		
	8'	9'	10'
48"	48"	48"	48"
42"	36"	36"	N/A
36"	27"	N/A	N/A

For SI: 1 inch = 25.4 mm

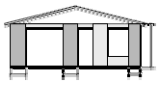
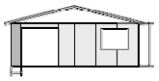
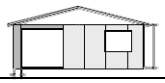
a. Interpolation shall be permitted.

R602.10.2.3 Adhesive attachment of sheathing in Seismic Design Category C. Adhesive attachment of wall sheathing shall not be permitted in Seismic Design Category C.

R602.10.3 Continuous sheathing methods. Braced wall lines with continuous sheathing constructed in accordance with this section shall be permitted.

R602.10.3.1 Continuous sheathing braced wall panels. Continuous sheathing methods require structural panel sheathing to be used on all sheathable surfaces of a braced wall line including areas above and below openings and gable end walls. Braced wall panels shall be constructed in accordance with one of the methods listed in Table R602.10.3.1.

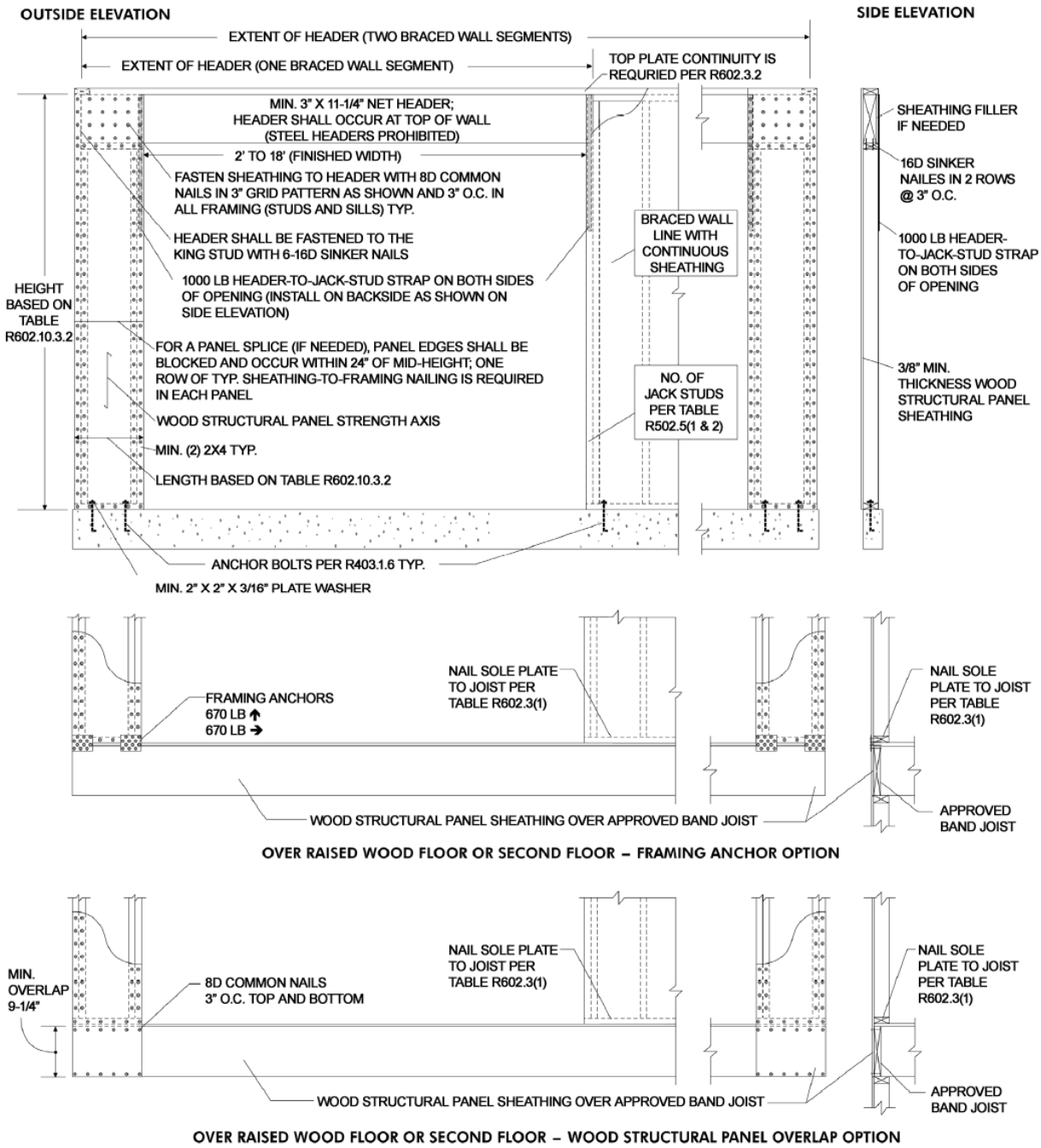
TABLE R602.10.3.1
CONTINUOUS SHEATHING METHODS

METHOD	MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA
CS-WSP	Wood structural panel	⅜"		6d common (2" x 0.113") nails at 6" spacing (panel edges) and at 12" spacing (intermediate supports) or 16 ga. x 1¾ staples: at 3" spacing (panel edges) and 6" spacing (intermediate supports)
CS-G[a]	Wood structural panel supporting roof load only adjacent garage openings	⅜"		See Method CS-WSP
CS-PF[b]	Continuous portal frame	See Figure R602.10.3.1		See Figure R602.10.3.1

For SI: 1 inch = 25.4 mm

a. Applies to one wall of a garage only.

b. The number of continuous portal frame panels in a braced wall line shall not exceed four. Continuous portal frame panels shall not be stacked vertically in multi-story buildings.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound = 4.45 N

NOT TO SCALE

FIGURE R602.10.3.1
METHOD CS-PF: CONTINUOUS PORTAL FRAME BRACED WALL PANELS

R602.10.3.2 Length of braced wall panels with continuous sheathing. Braced wall panels along a braced wall line with continuous sheathing shall be full-height with a length based on the adjacent clear opening height in accordance with Table R602.10.3.2. Where a panel has an opening on either side of differing heights, the taller opening shall govern when determining the panel length from Table R602.10.3.2. Only those full-height braced wall panels complying with the length requirements of Table R602.10.3.2 shall be permitted to contribute towards the minimum required percentage of bracing per Table R602.10.1.5. For Method CS-PF, wall height shall be measured from the top of the header to the bottom of the bottom plate as shown in Figure R602.10.4.3.1.

TABLE R602.10.3.2
LENGTH REQUIREMENTS FOR BRACED WALL PANELS
IN A BRACED WALL LINE WITH CONTINUOUS SHEATHING[a]

METHOD	ADJACENT CLEAR OPENING HEIGHT	WALL HEIGHT				
		8'	9'	10'	11'	12'
CS-WSP	64"	24"	27"	30"	33"	36"
	68"	26"	27"	30"	33"	36"
	72"	28"	27"	30"	33"	36"
	76"	29"	30"	30"	33"	36"
	80"	31"	33"	30"	33"	36"
	84"	35"	36"	33"	36"	36"
	88"	39"	39"	36"	38"	36"
	92"	44"	42"	39"	41"	36"
	96"	48"	45"	42"	43"	39"
	100"		48"	45"	47"	42"
	104"		51"	48"	48"	44"
	108"		54"	51"	51"	47"
	112"			54"	53"	50"
	116"			57"	56"	53"
	120"			60"	58"	55"
	124"				61"	58"
	128"				63"	61"
	132"				66"	64"
	136"					66"
	140"					69"
	144"					72"
CS-G	≤120"	24"	27"	30"	33"	36"
CS-PF	≤120"	16"	18"	20"	22"	24"

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

a. Interpolation shall be permitted.

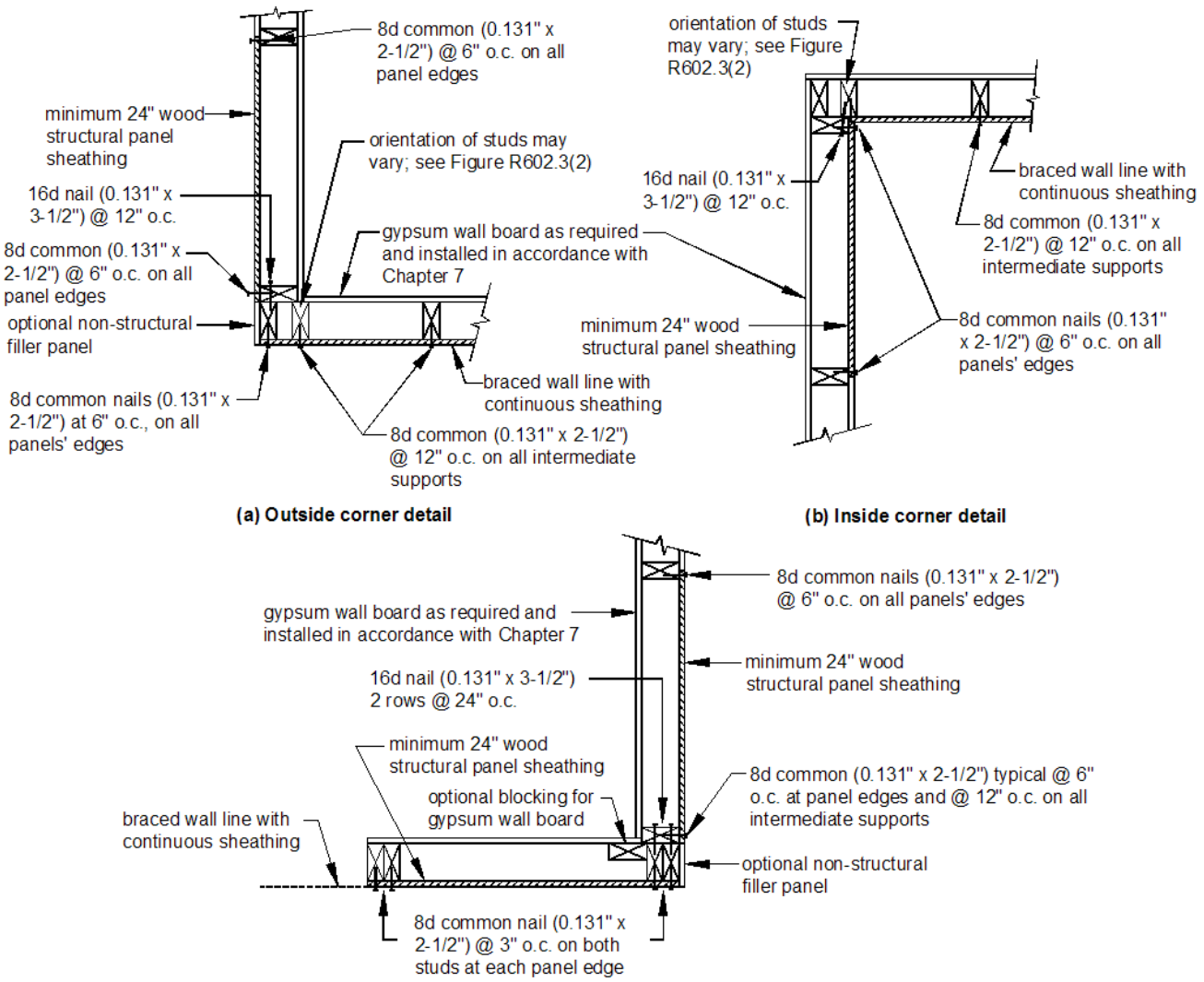
R602.10.3.3 Braced wall panel location and corner construction. Full-height wall panels complying with the length requirements of Table R602.10.3.2 shall be located at each end of a braced wall line with continuous sheathing and at least every 25 feet (7620 mm) on center.

A minimum 24 inch (610 mm) wood structural panel corner return shall be provided at both ends of a braced wall line with continuous sheathing in accordance with Figures R602.10.3.3(1) and R602.10.3.3(2). In lieu of the corner return, a hold-down device with a minimum uplift design value of 800 lb (3560 N) shall be fastened to the corner stud and to the foundation or framing below in accordance with Figure R602.10.3.3(3).

Exception: The first braced wall panel shall be permitted to begin 12.5 feet (3810 mm) from each end of the braced wall line provided one of the following is satisfied:

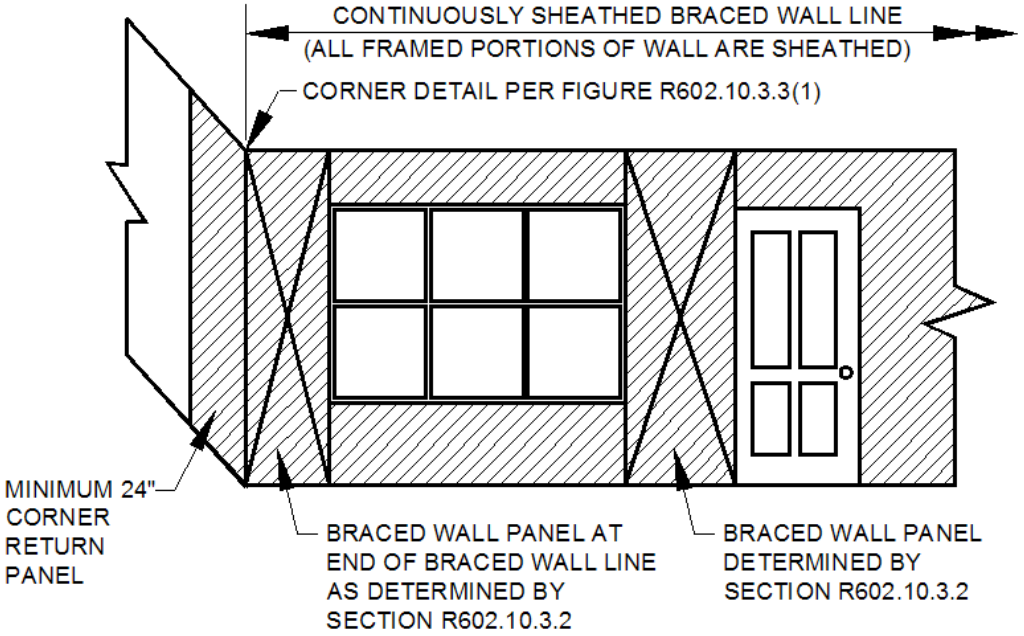
1. A minimum 24 inch (610 mm) long, full-height wood structural panel is provided at both sides of a corner constructed in accordance with Figures R602.10.3.3(1) and R602.10.3.3(4), or

2. The braced wall panel closest to the corner shall have a hold-down device with a minimum uplift design value of 800 lb (3560 N) fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below in accordance with Figure R602.10.3.3(5).



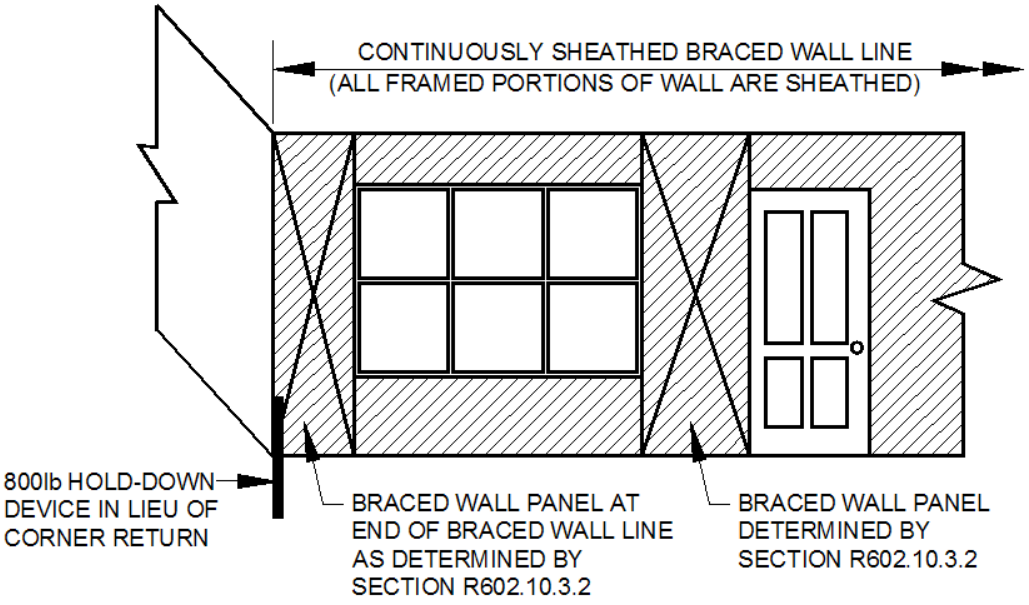
For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

FIGURE R602.10.3.3(1)
TYPICAL EXTERIOR CORNER FRAMING FOR CONTINUOUS SHEATHING



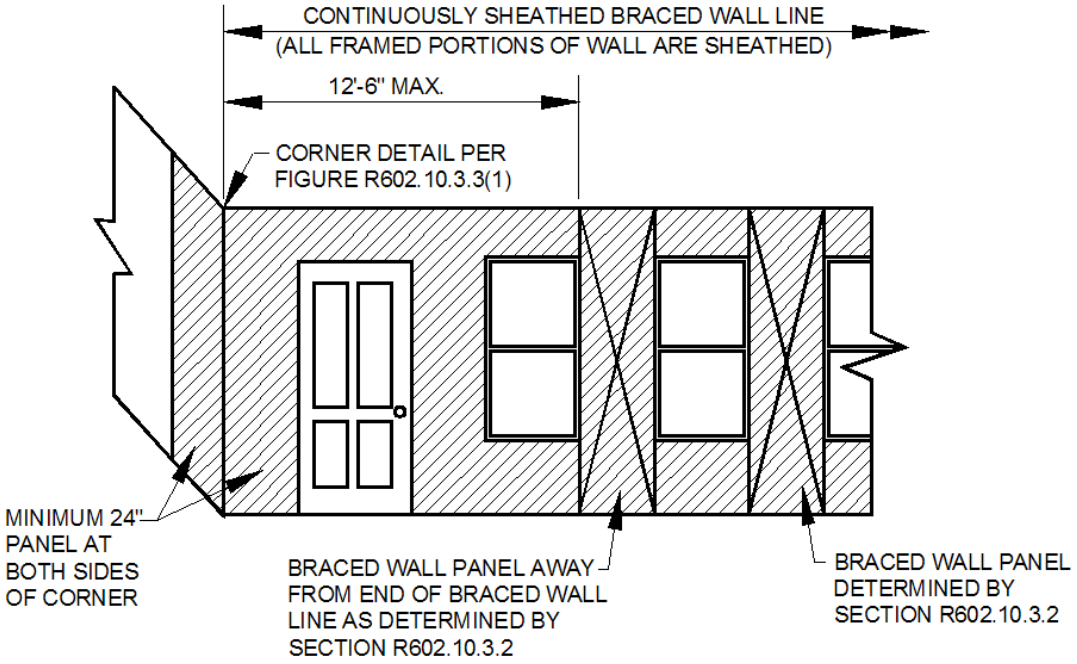
For SI: 1 foot = 305 mm

FIGURE R602.10.3.3(2)
BRACED WALL LINE WITH CONTINUOUS SHEATHING WITH CORNER RETURN PANEL



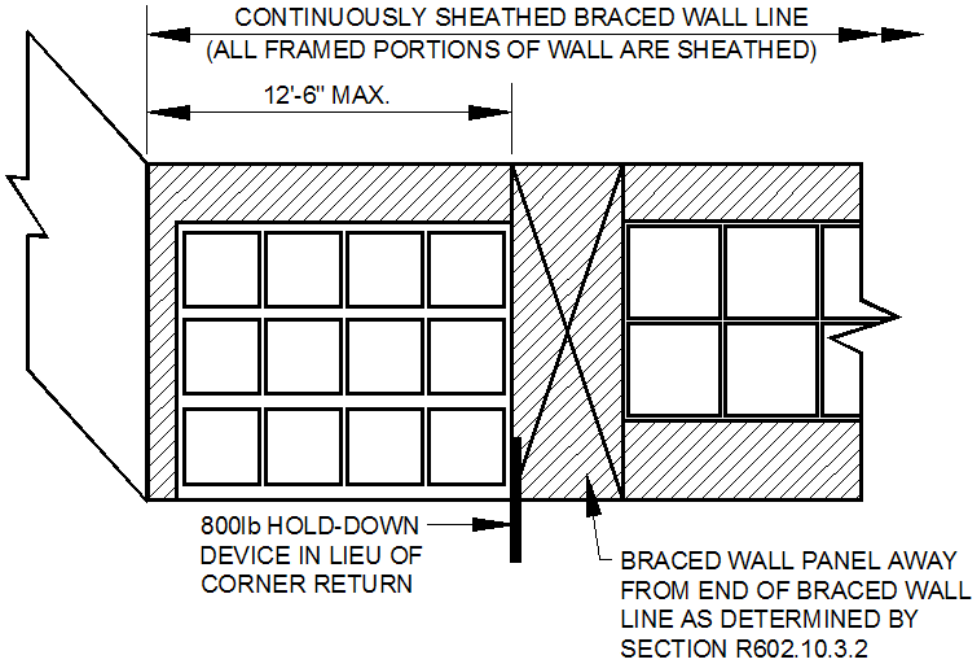
For SI: 1 foot = 305 mm, 1 pound = 4.45 N

FIGURE R602.10.3.3(3)
BRACED WALL LINE WITH CONTINUOUS SHEATHING WITHOUT CORNER RETURN PANEL



For SI: 1 foot = 305 mm

FIGURE R602.10.3.3(4)
BRACED WALL LINE WITH CONTINUOUS SHEATHING – FIRST BRACED WALL PANEL AWAY FROM END OF WALL LINE WITHOUT HOLD-DOWN



For SI: 1 foot = 305 mm, 1 pound = 4.45 N

FIGURE R602.10.3.3(5)
BRACED WALL LINE WITH CONTINUOUS SHEATHING – FIRST BRACED WALL PANEL AWAY FROM END OF WALL LINE WITH HOLD-DOWN

R602.10.4 Braced wall panel finish material. Braced wall panels shall have ½-inch thick gypsum board installed on the side of the wall opposite the bracing material and fastened in accordance with Table R702.3.5.

Exceptions:

1. Braced wall panels that are constructed in accordance with Methods GB, ABW, IPF and CS-PF.

2. When an approved interior finish material with an in-plane shear resistance equivalent to gypsum board is installed.

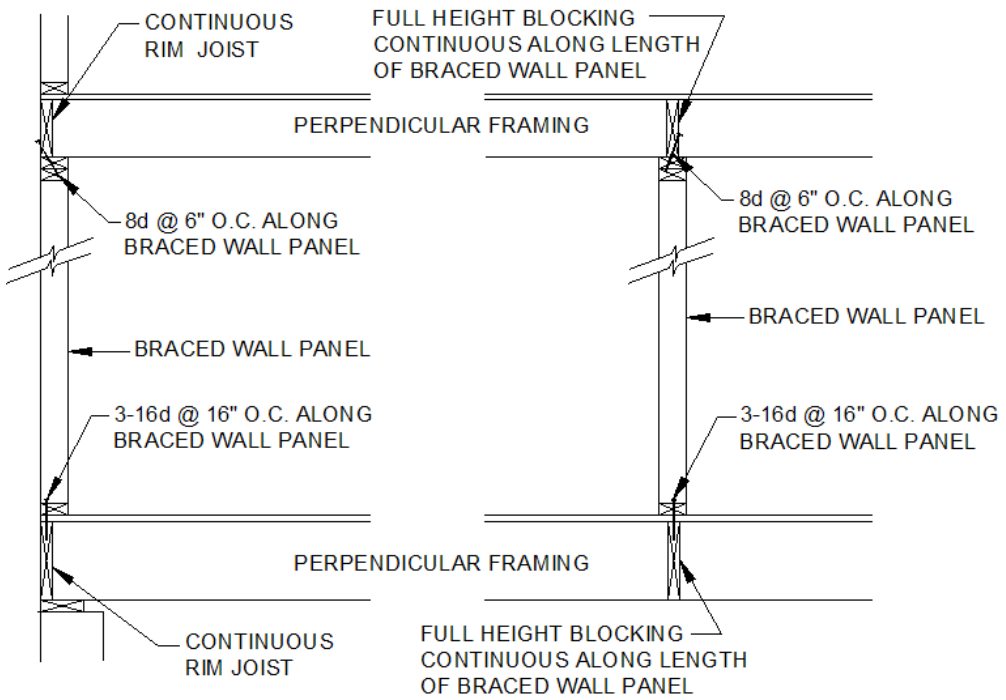
3. For Methods DWB, WSP, SFB, PBS, PCP, and HPS, interior gypsum board may be partially or entirely omitted provided the minimum required percentage of bracing in Table R602.10.1.5 is multiplied by an adjustment factor of 1.5.

R602.10.5 Braced wall panel connections. Braced wall panels shall be connected to floor/ceiling framing or foundations as follows:

1. Where framing is perpendicular to a braced wall panel above or below, a rim joist or blocking shall be provided along the entire length of the braced wall panel in accordance with Figure R602.10.5(1). Fastening of wall plates to framing, rim joist or blocking shall be in accordance with Table R602.3(1).

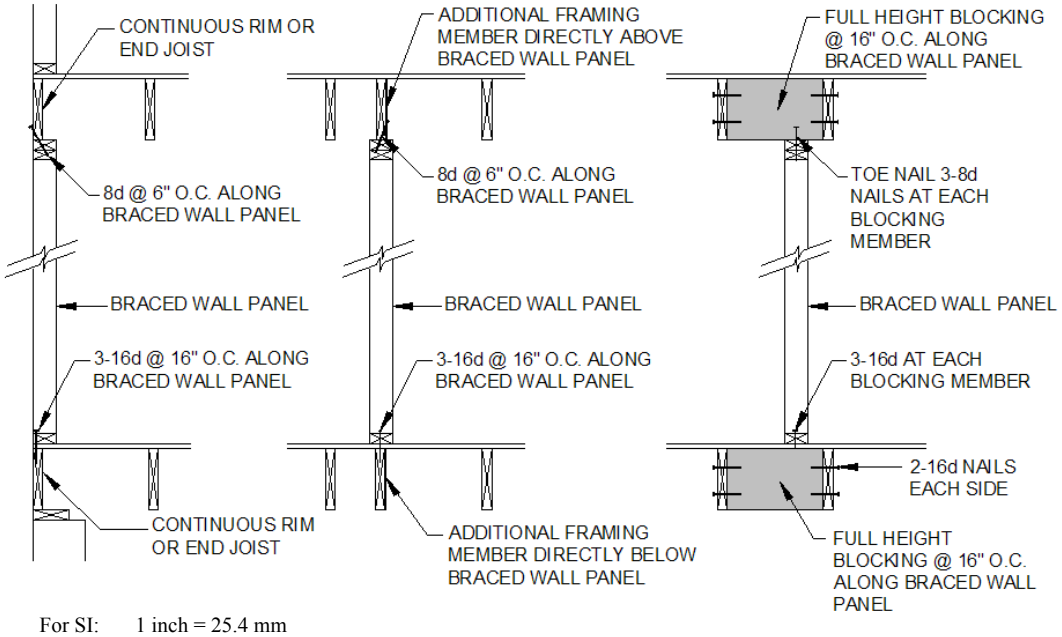
2. Where framing is parallel to a braced wall panel above or below, a rim joist, end joist or other parallel framing member shall be provided directly above and below the panel in accordance with Figure R602.10.5(2). Where a parallel framing member cannot be located directly above and below the panel, full-depth blocking at 16 inch (406 mm) spacing shall be provided between the parallel framing members to each side of the braced wall panel in accordance with Figure R602.10.5(2). Fastening of blocking and wall plates shall be in accordance with Table R602.3(1).

3. Connections of braced wall panels to concrete or masonry shall be in accordance with Section R403.1.6.



For SI: 1 inch = 25.4 mm

FIGURE R602.10.5(1)
BRACED WALL PANEL CONNECTION WHEN PERPENDICULAR
TO FLOOR/CEILING FRAMING



For SI: 1 inch = 25.4 mm

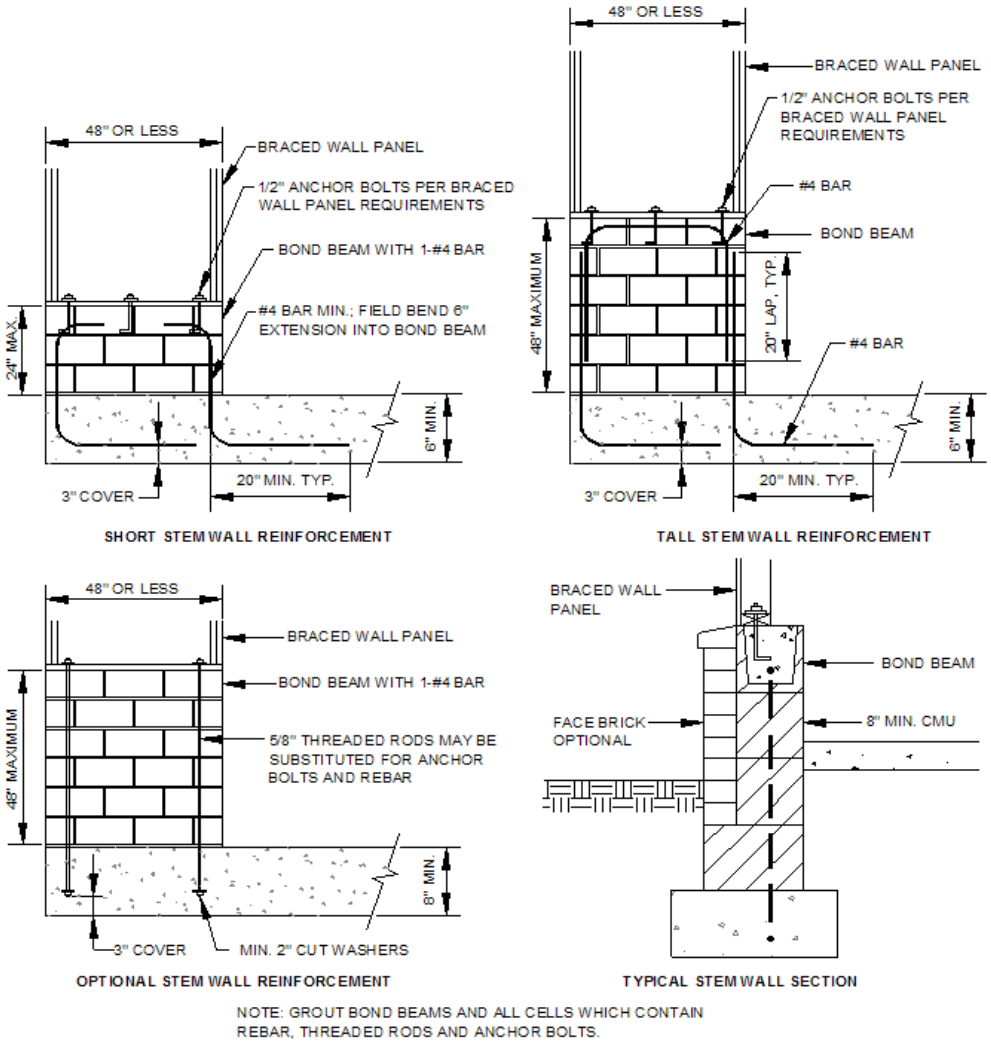
FIGURE R602.10.5(2)
BRACED WALL PANEL CONNECTION WHEN PARALLEL
TO FLOOR/CEILING FRAMING

R602.10.6 Braced wall panel support. Braced wall panels shall be supported as follows:

1. Braced wall panels shall be permitted to be supported on cantilevered floor joists meeting the cantilever limits of Section R502.3.3 provided joists are blocked at the nearest bearing wall location.

2. Elevated post or pier foundations supporting braced wall panels shall be designed in accordance with accepted engineering practice.

3. Masonry stem walls supporting braced wall panels with a length of 48 inches (1220 mm) or less shall be reinforced in accordance with Figure R602.10.6. Masonry stem walls supporting braced wall panels with a length greater than 48 inches (1220 mm) shall be constructed in accordance with Section R403.1. Braced wall panels constructed in accordance with Methods ABW and IPF shall not be permitted to attach to masonry stem walls.



For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

FIGURE R602.10.6
MASONRY STEM WALLS SUPPORTING BRACED WALL PANELS

R602.10.7 Panel joints. All vertical joints of braced wall panel sheathing shall occur over and be fastened to common studs. Horizontal joints in braced wall panels shall occur over and be fastened to common blocking of a minimum 1-½ inch (38 mm) thickness. Panel joints for Method IPF shall be constructed in accordance with Figure R602.10.2.1(2). Panel joints for Method CS-PF shall be constructed in accordance with Figure R602.10.3.1.

Exception: Blocking at horizontal joints shall not be required in braced wall panels constructed using Methods WSP, SFB, GB, PBS or HPS where the percentage of bracing required by Table R602.10.1.5 is multiplied by an adjustment factor of 2.0.

R602.10.8 Cripple wall bracing. Cripple walls shall be braced with a percentage and type of bracing as required for the wall above in accordance with Table R602.10.1.5 with the following modifications for cripple wall bracing:

1. The bracing percentage as determined from Table R602.10.1.5 shall be multiplied by an adjustment factor of 1.15, and

2. The wall panel spacing shall be decreased from 25 feet (7620 mm) to 18 feet (5486 mm).

Cripple walls shall be permitted to be redesignated as the first story walls for purposes of determining wall bracing requirements. If the cripple walls are redesignated, the stories above the redesignated story shall be counted as the second and third stories respectively.

37. Change Section R613.2 to read:

R613.2 Window sills. In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 18 inches (457 mm) above the finished floor of the room in which the window is located. Glazing between the floor and 18 inches (457 mm) shall be fixed or have openings through which a 4-inch-diameter (102 mm) sphere cannot pass.

Exceptions:

1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.

2. Openings that are provided with window guards that comply with ASTM F 2006 or F 2090.

38. Change Section R806.4 and add Table R806.4 to read:

R806.4 Unvented attic assemblies. Unvented attic assemblies (spaces between the ceiling joists of the top story and the roof rafters) shall be permitted if all the following conditions are met:

1. The unvented attic space is completely contained within the building thermal envelope.

2. No interior vapor retarders are installed on the ceiling side (attic floor) of the unvented attic assembly.

3. Where wood shingles or shakes are used, a minimum ¼ inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.

4. In climate zones 5, 6, 7 and 8, any air-impermeable insulation shall be a vapor retarder, or shall have a vapor retarder coating or covering in direct contact with the underside of the insulation.

5. Either Items a, b or c shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.